Inequalities, Employment and Income Convergence in Europe:

Evidence from Regional Data

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Abstract:

This paper explores the relationship between pay inequality and unemployment rates for 187 European Regions from 1984-2003. We measure inequality within the regions -- between 16 industrial sectors in each region -- and also between the regions: thus the inequality measures are nested. Our model of unemployment employs a panel structure that permits us to separate regional, national and continental influences on European unemployment. This allows us to test whether a tradeoff exists between cohesion and competitiveness. We find no evidence of this tradeoff; instead lower pay inequality is generally associated with a lower regional unemployment rate. We find strong country effects lowering unemployment (relative to the model) in relatively smaller countries such as Ireland, Austria, Portugal and the Netherlands; on the other hand unemployment is high, relative to the model, in Spain and Poland. Time effects reveal the effects of European macro-environment on regional unemployment. We find an employment penalty associated with the Maastricht Treaty (1992) and its implementation of around four percentage points, lasting until 1998, when a general reduction in unemployment appears to coincide with the arrival of the Euro. Unfortunately, the pattern is again reversed in 2000, coinciding with the implementation of the Lisbon Treaty.

Introduction

The achievement of territorial and social cohesion is a well known statutory objective embedded into the preambles of the European Union Treaty -- from the original Treaty of Rome in 1957 onward -- and enforced the European Commission mainly through regional policies. Reducing inequalities is high in the Commission's policy agenda especially after the accession of new members has amplified the inequalities of Europe by mere virtue of their lower income levels. Achieving cohesion is a clearly-stated (Objective 1) and actively-pursued objective of the Structural Funds; yet the introduction of the Lisbon Treaty and its emphasis on competitiveness (Objectives 2 and 3) seems to run counter to the achievement of cohesion. At least, so it is often argued. This paper finds no evidence of such a tradeoff. Instead, we argue that both objectives -- cohesion and competitiveness -- can coexist. And not only that, our evidence suggests that cohesion is a useful and even perhaps a necessary condition for enhanced efficiency in Europe's labor markets.

Section One presents measures of wage inequality within regions and between them for approximately 187 NUTS 2 regional observations. The former is a measure of social cohesion, while the latter a measure of territorial cohesion. This section combines both measures and finds a striking pattern: the wealthy regions are markedly less unequal than the poorer regions.

Section Two explores causal mechanisms between pay inequality and unemployment in regional labor markets. Here we re-test a regional model of unemployment proposed by Galbraith and Garcilazo (2004) using new observations and updating a substantial part of the original data. The model tests the impact of four variables on regional unemployment rates: growth, demographic structure, relative wealth and inequality. Furthermore, the model is a two-way fixed effects specification, which allows us to estimate the effects of national labor market institutions -- through country-effects -- and of European supranational policies -- through time-effects -- on regional unemployment rates. Section Three discusses policy implications.

1. Measuring Inequality Between and Within European Regions

The European Commission (EC) defines economic and social cohesion as: "…an expression of solidarity between the Member States and regions of the European Union (EU)…" The aim of cohesion is to "… balance development throughout the EU, reduce

structural disparities between regions and promote equal opportunities for all" (Europe Glossary[1]).

This policy objective -- the reduction of territorial disparities – is not new in the European model of integration. It has been embedded into the preambles of the European Union Treaty since the beginning, from the original Treaty of Rome in 1957, to the Single European Act (SEA) (Article 130a) and more recently in the proposed Constitutional Treaty (Article III-220).

The EC purses this objective through a Cohesion Policy, assigning financial resources to eligible regions according to three objectives: the convergence objective (Objective 1), the regional competitiveness and employment objective (Objectives 2 and 3) and the territorial cooperation objective. The effectiveness of these instruments in achieving these objectives -- especially Objective 1 where the bulk of resources are allocated -- has generated an ongoing debate, whose terms depend on how to define and measure cohesion and consequently inequality. Literature measuring inequality in the EU falls into two broad categories: the first concerned with territorial or economic cohesion, and the second with social cohesion.

The measurement of territorial cohesion focuses on movements in GDP per capita over time among European countries and regions. Studies of this kind find convergence in per capita income between EU countries during 1980-2005, but divergence between regions within countries (Sapir *et al.,* 2003). Inequality within counties accounts for roughly half of total EU inequality in the early 1980s, but rises to about two-thirds by the mid-1990s (Puga, 2002; Neven and Gouyette, 1995). The test to determine these facts is a sigma convergence[2] or beta convergence[3] test in per capita income levels as proposed by Sala i Martín (1996).

The measurement of social cohesion focuses on interpersonal income inequality. At the European level, Morrisson and Murtin (2003) estimate a measure of income inequality for 1970, 1980, 1990, 1995, and 1998, and Beblo and Knaus (2001) estimate a single measure of European inequality for 1995. Morrisson and Murtin find that inequality within countries first

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[1] http://europa.eu/scadplus/glossary/economic_social_cohesion_en.htm

[2] The testing for sigma-convergence is based on standard deviation of the cross-section series. An alternative way is to use the coefficient of variation.

[3] The beta-convergence test is obtained by a regression analysis. The per capita income of a chosen period of time is estimated as a function of the initial level of per capita income. It is specified through the following equation: $(1/T)*\log(Y_{it}/Y_{i0}) = \alpha + \beta * \log Y_{i0} + \gamma * X_{it} + u_{it}$, where α is a constant term, Y_{it} the real per capita income of country i at time t, Y_{i0} the initial per capita income, X_{it} a set of structural exogenous variables influencing the growth of per capita income, T the time in which the dynamics of convergence is measured, and u_{it} the stochastic error.

falls from 1970 to 1980, and then returns to the 1970s level by the late 1990s, while inequality across countries falls by half between 1970 and 1998 with a particularly sharp decrease starting in the 1980s. At the national level this literature is rich, drawing data from two main surveys: the Luxembourg Income Study (LIS) and the European Community Household Panel (ECHP). Both surveys, although comparable at the national level, have very limited coverage at the regional level.

Our approach departs from both lines of literatures and instead combines both measures, territorial and social cohesion, into a single additive metric, using Theil's T statistic and its property of decomposability. Furthermore our inequality measures depart from the traditional focus on household *income inequality* and instead focus on interpersonal *pay inequality*, which is suitable for issues related to labor market outcomes and economic competitiveness. Therefore we no longer depend on surveys and instead make use of payroll data which carry several advantages:

The first advantage is that we can construct comparable measures of inequality at the level of the region. Given that time series data for payroll are available for the last two decades, we can also trace movements of inequality over this time period.

A second advantage is that the method allows us to measure inequality at multiple hierarchical levels. Theil's T statistic, which we construct within each region as a measure of inequality between economic sectors within that region, allows us to combine measures of inequality within and between regions to achieve a measure of the movement of inequality at the European level. Therefore we can determine (for example) whether richer or poorer regions (relative to the European average) tend to be more or less unequal internally. This allows us to understand the interrelation between territorial and social cohesion.

Finally our measures of inequality are easy to update at a low cost. Survey studies are very expensive projects, a fact that limits the availably of observations across countries and time. The high cost is also an impediment to producing observations at the regional level. The payroll measures, on the other hand, are very inexpensive to obtain and to keep-up-to-date. However Eurostat's recent decision to discontinue publishing employment data for 16 sectors within each region raises some concern as to whether our project will continue to be feasible into the future.

One of the attractive features of Theil's T statistic is its property of decomposability. As long as a distribution of income and a distribution of individuals are grouped into mutually exclusive and completely exhaustive (MECE) groups, overall inequality can be broken down into a between-groups component and a within-groups component. The technique is founded on the original work of Henri Theil (1972). Formal expressions of our method are documented by Conceição and Galbraith (2000) and in Conceição *et al.* (2001).

The data source needed to compute Theil's T statistic is payroll data (employment and wages) published by Eurostat and disaggregated into 16 industrial sectors (Appendix 1) at the NUTS Levels 0 (country), 1, 2, and 3. As unit of analysis we selected NUTS level 2 (when available[4]) to remain consistent with the European Commission and their decision to assign financial support at this level. Coverage at level 3 is also scarce in some geographical areas.

Our first measure of inequality, at the regional level, is the within-regions between-sectors Theil's T statistic. It measures inequality within each region, between economic sectors categorized by NACE Rev. 1.1 for each region. All regions have the same grouping structure,[5] enabling us to compare observations consistently with one other and over time.

The between-sectors within-regions component of Theil's T statistic is expressed as:

$$T_j = \sum_{i=1}^{n} P_i \left(\frac{\overline{Y_{ij}}}{\overline{Y_j}} \right) \log \left(\frac{\overline{Y_{ij}}}{\overline{Y_j}} \right) \qquad \forall\ j \tag{1}$$

where $$P_i = \left(\frac{P_{ij}}{P_j} \right)$$

T_j is the between-sectors within-region component of Theil's T statistic for the j^{th} region. $P_i^{'}$ is the share of employment of the i^{th} sector of the j^{th} region to the total employment of the j^{th} region, where P_{ij} is the number of individuals employed in the i^{th} sector of the j^{th} region.

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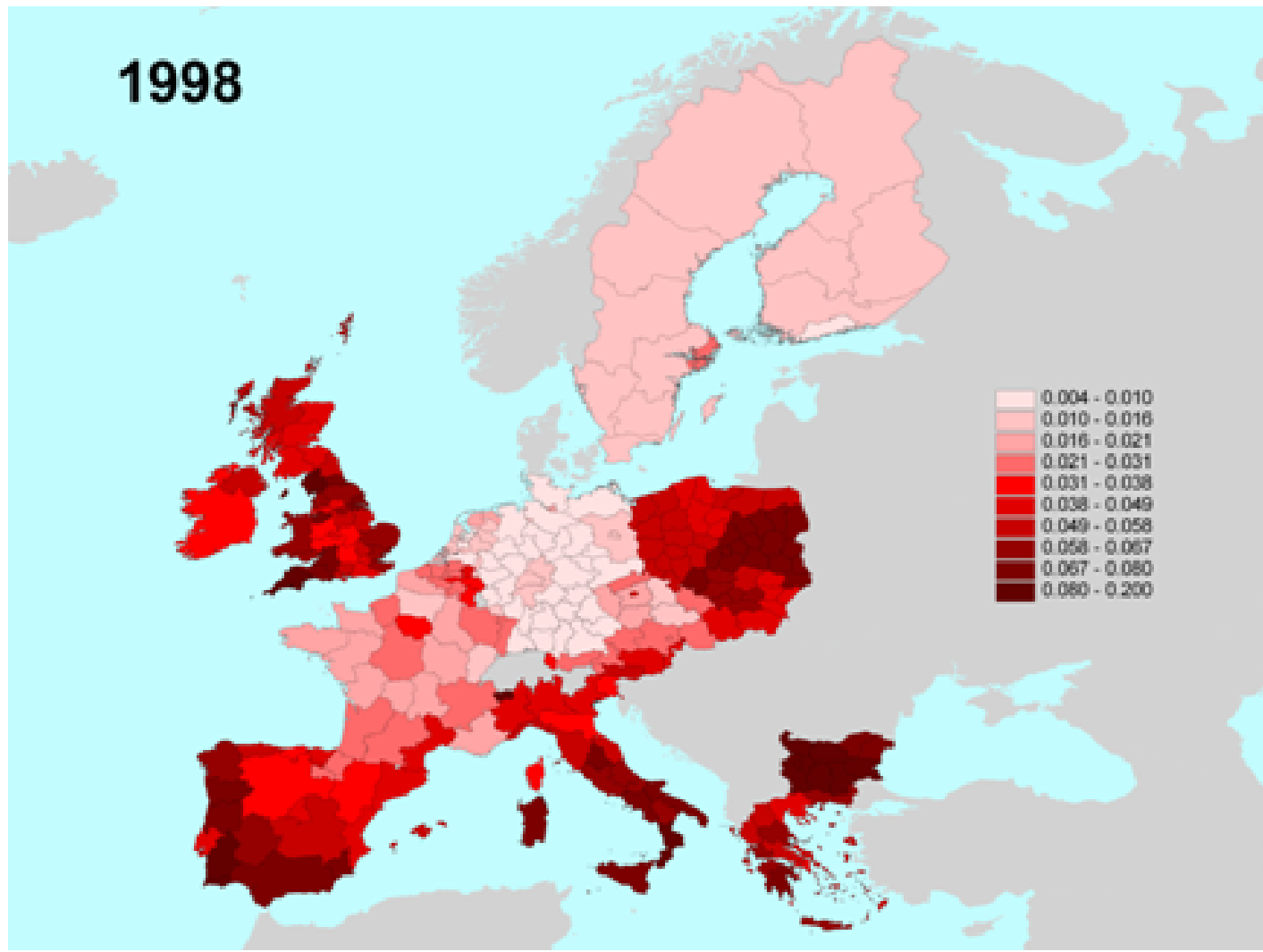
[4] Germany is the only country for which data are not available at level 2.

[5] All regions are partitioned into the same sixteen sectors (NACE for 1983-1994 and NACE Rev. 1.1 for 1995-2003).

Coverage for the within-regions between-sectors component of Theil's T statistic in Eurostat's Regio database covers the years (1983-1994) in the database ESA-79 and (1995-2003) in ESA-95. The number of observations varies each year according to available payroll data, ranging from 45 to 90 administrative regions in ESA-79 and from 191 to 214 in ESA-95 with maximum coverage in 1998.

There are a total of 1204 regional observations from 1995 to 2000. The lowest value (0.0044) occurs in Thüringen (deg), Germany, in 1995 while the highest (0.269) in Severozapaden (bg 11), Bulgaria, in 1999. Figure 1 displays the values of the within-regions between-sectors component of Theil's T statistic for the year with maximum coverage, 1998.

Figure 1. Within-Regions Between-Sectors Theil's T Statistic, 1998



At the European wide level, we present a measure of European-wide inequality statistic that divides Europe into a set of regions. It contains two components: the between-regions component and the within-regions component. The between-regions component measures inequality between all the European regions, and the within regions component measures inequality within the regions (weighted by the relative income of the regions) between their corresponding economic industries.

We use the between-regions component as a measure of territorial cohesion, since this measure is the sum of the contribution of each region to total inequality in the EU. More precisely, it is the weighted sum of the logarithm of the ratio of the average income for each region to the average income of all the regions in the EU, and it is expressed as:

$$T^B = \sum_{j=1}^{m} \left(\frac{P_j}{P} \right) \left(\frac{\overline{Y_j}}{\overline{\overline{Y}}} \right) \log \left(\left(\frac{\overline{Y_j}}{\overline{\overline{Y}}} \right) \right) \qquad (2)$$

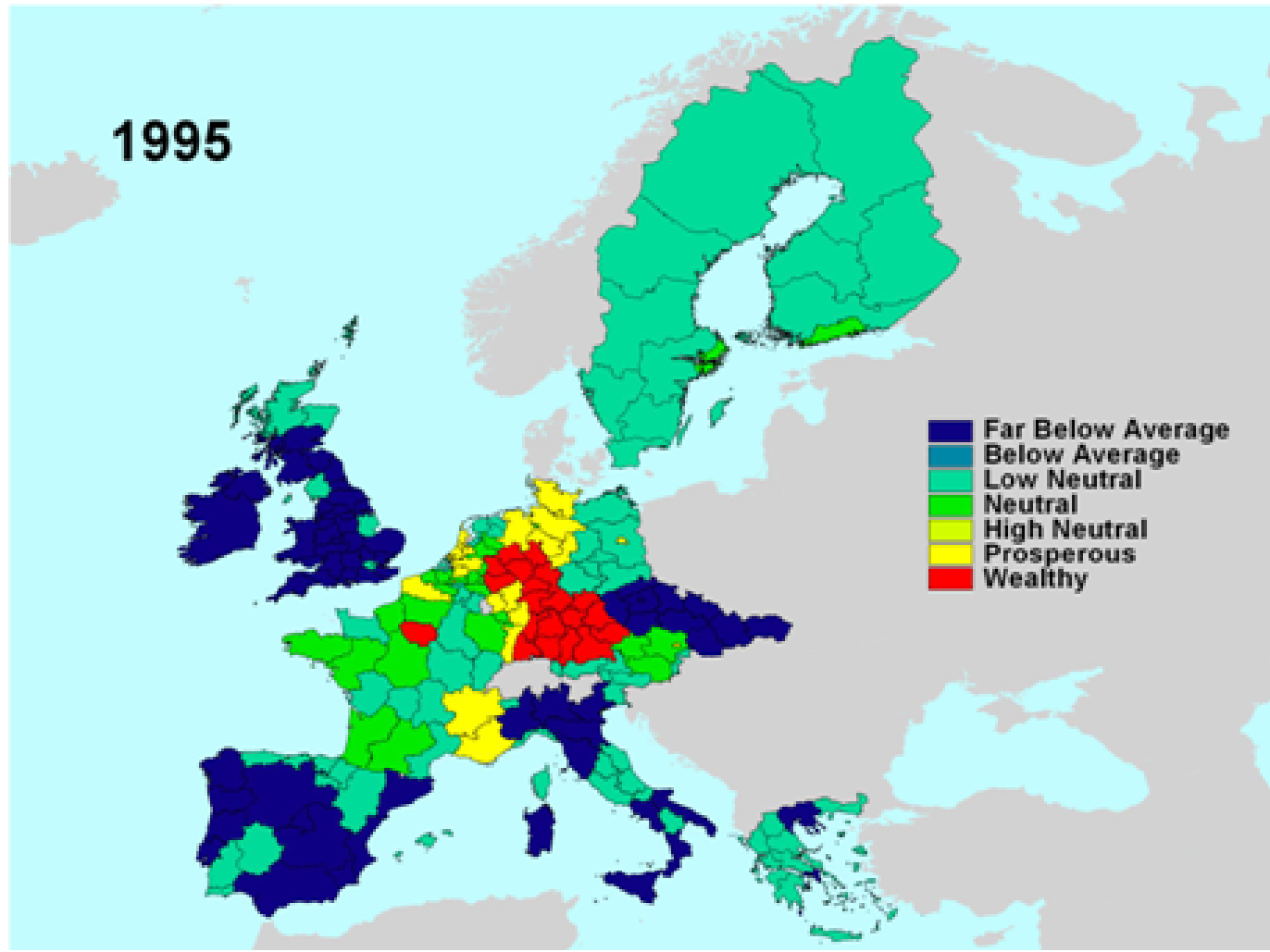
The individual elements of the between-regions component of the European-wide Theil's T statistic reveal which regions are wealthy and which ones are poor relative to average pay in Europe – with the contribution weighted by share in total employment.[6] When the number of regions is not constant from year to year, these "Theil elements" cannot be compared over time since changes in the European average ($\overline{\overline{Y}}$ in equation 2) can occur as a result of having a different number of observations per year and not because an actual change in the pay structure had occurred.

For this reason we compute a time series of the between-regions elements of Theil's T statistic (the expression within the summation in Equation 2) with the same number of regions in each year. Data with this constraint range from 1995-2000 mainly due to a regional re-classification in the NUTS system for regions from Italy, Finland, Portugal and Spain.

The Theil element, or contribution to overall inequality between-regions in Europe, for each of the 187 regions for 1995 is given in Figure 2.

[6] Regions with a positive Theil element are the wealthy regions, while regions with a negative Theil element are poorer regions. A necessary condition for a region *j* to have a positive Theil element in Equation 3.2 is for the average wage of region *j* to be higher than the average European wage.

Figure 2. Regional Contribution to the European-wide Theil's T Statistic, 1995

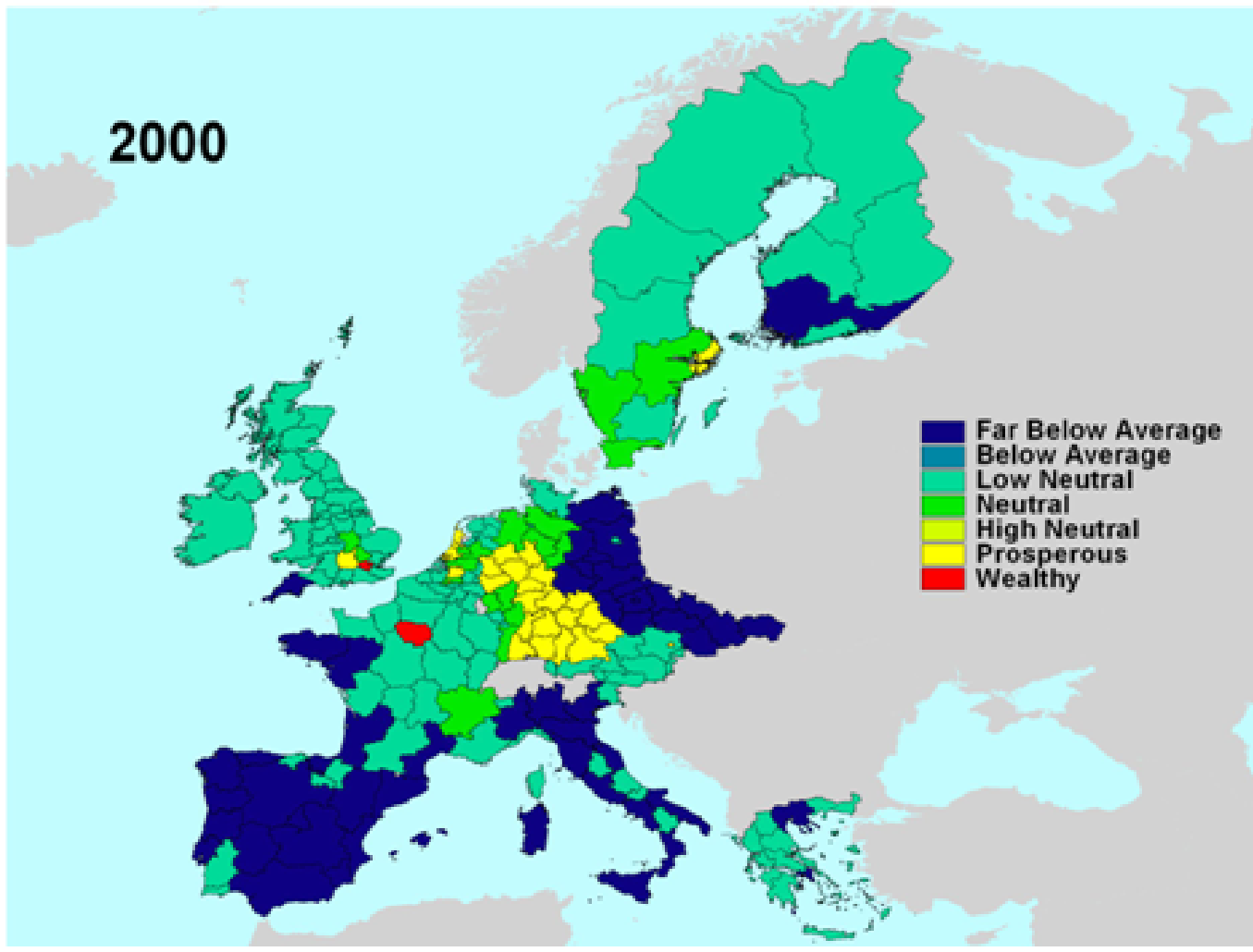


In 1995, regions from Germany were contributing heavily to inequality "from above," while most regions from the Czech Republic, Slovakia, Spain, Portugal, Ireland, England, and some regions of Italy and Greece were contributing to European inequality from below the average. The metropolitan regions: London (Inner and Outer), Île-de-France (Paris), Berlin, and Stockholm as expected exhibit higher wage levels than their neighboring regions. It is worth noting that the low standing of the UK at this moment reflected the weakness, at the time, of sterling: our measures are not PPP-adjusted and it would not be appropriate to do so, since the metric of competitiveness is related to profitability measured in nominal terms. In 1995 relative wages in Britain were low, and would have seemed low to a corporation comparing industrial location sites in, say, Manchester and Hamburg.

By fixing the legend values to a base year (1995) and graphing the Theil components of the same regions in subsequent years, one can observe which regions have gained and which ones have lost relative to 1995. Figure 3 displays the Theil elements for the year 2000. Of particular interest is the extent of inter-regional convergence that evidently occurred

during this short period. Relative to 1995, the gaps between Germany and Britain, in particular are noticeably smaller than they were, a fact documented in Galbraith and Garcilazo (2005). Exchange rate changes, once again, are no doubt responsible for a considerable amount of this inter-regional convergence.

Figure 3. Regional Contribution to the European-wide Theil's T Statistic, 2000

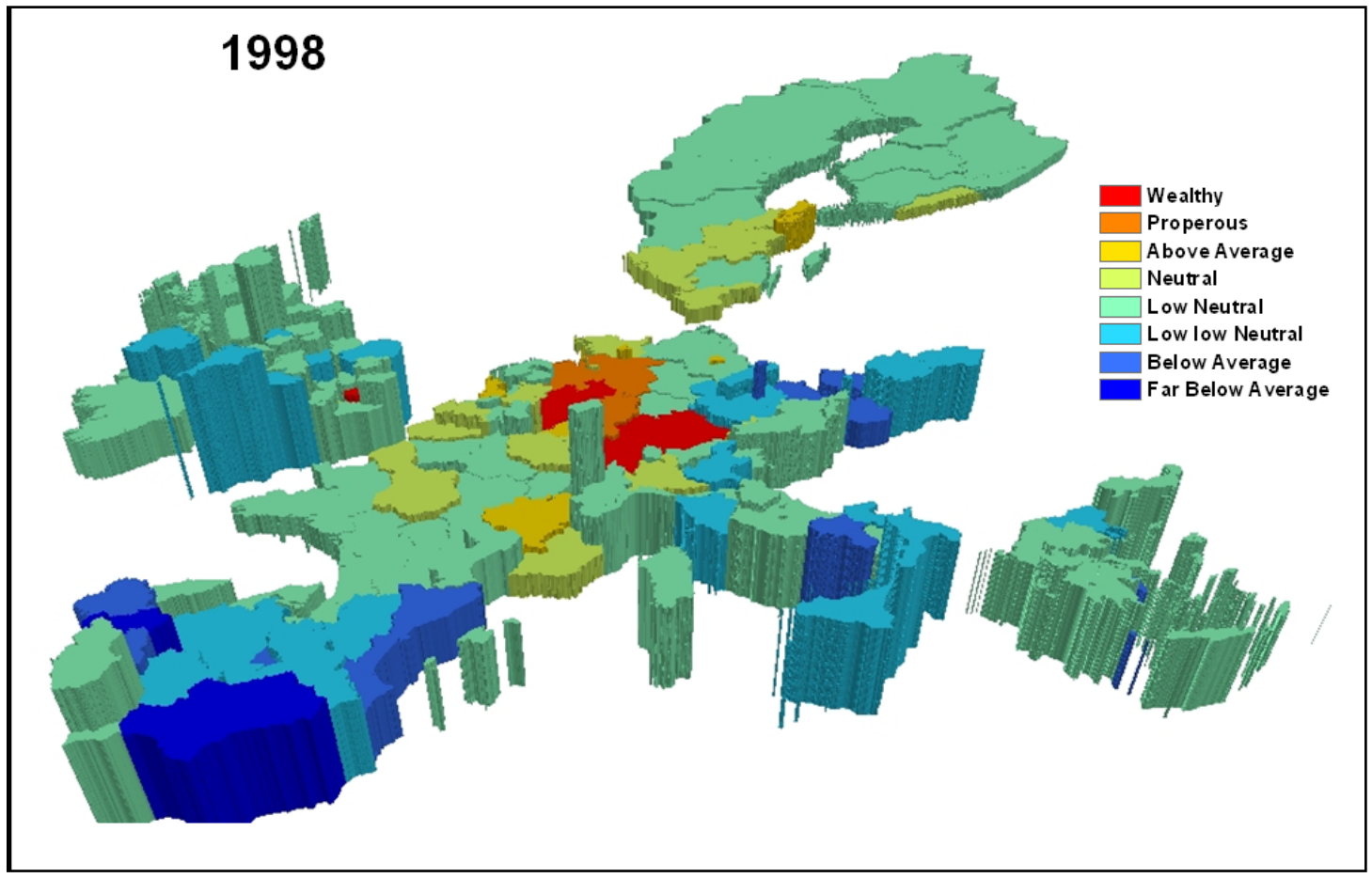


As previously noted, the between-regions component measures trends in territorial cohesion, while the within-regions between-sectors Theil's T statistic reveals the degree of interpersonal pay-inequality within regions, a measure of social cohesion. Although both dimensions are interesting on their own, if combined together they reveal a very interesting pattern. This is given by Figure 4[7]: wealthy regions (contributing to inequality from above the average) have strikingly lower levels of inequality within them. These include Germany, France, and the Scandinavian countries. On the other hand, poorer regions such as Spain,

[7] This figure displays a three dimensional graph (created by Arcview, version 9, with the 3-D extension), representing the between–regions component (territorial cohesion) by the color scheme (consistent with the legends used in the Figures 2-3), and the within–regions component (social cohesion) by the height of each region

Italy, Greece, Portugal and the Czech Republic, consistently have higher levels of inequality between sectors, within regions.

Figure 4. Between-Regions Component and Within-Regions Theil's T Statistic, 1998



These findings relate territorial and social cohesion to each other. However, it is not yet clear whether these concepts are merely correlated, or whether there exists a causal mechanism tying them together. This question brings us to the next section.

2. A Regional Model of Unemployment

This section explores the relationship between social cohesion and competitiveness. We measure social cohesion by inequality in the regional pay structure, and competitiveness by a region's capacity to employ its labor force or, differently said, to reduce unemployment rates. We test a regional model of unemployment proposed by Galbraith and Garcilazo (2004) with a substantial update of the data and inclusion of new observations. This allows us to (1) test the relationship between pay inequality and unemployment, (2) estimate the effects of national-related factors such as national labor market institutions or the informal economy and (3) estimate the effects of supranational factors such as pan European policies, on regional unemployment rates with a larger data sample as used in Galbraith and Garcilazo (2004), and more up-to-date data -- up to 2003.

The model proposed by Galbraith and Garcilazo (2004) identifies two supply and two demand variables that influence variation in regional unemployment rates. We use the same model specification. The supply variables are the relative size of the population of young workers and a measure of the inequality of the wage structure; and the demand variables are the strength of economic growth at any given time and the average wage rate of the region relative to the average for Europe as a whole.

Theoretical Arguments for a Regional Model of Unemployment

Ex ante we expect both demand variables to reduce unemployment rates and both supply variables to augment them.

We expect our first supply variable, growth of GDP, to reduce regional unemployment mainly through the dynamics in the construction and investment sectors. Strong regional economic activity creates jobs. When the growth rate of the economy decreases, firms start to decrease their investments and to reduce labor demand. The introduction of this variable is captures the effects of business cycles on regional rates of unemployment.

The effect of our second demand variable is equally simple: we expect richer regions to offer more jobs, particularly more on-the-books jobs, both in the public and private sectors. But it is interesting to note that the effect of this variable is contingent on a larger proposition: that the European economy is, in fact, integrated. Our "wealth" measure is relative to the European average. In a world of mutually insulated local or national labor markets – the

world that still governs most economic models—the relative income of countries should have no effect on their internal unemployment rates, since each market would clear separately. The finding of any effect for a Europe-wide wealth variable is thus a significant confirmation of European interconnectedness. We project a negative effect: greater wealth leads to less unemployment, on grounds that are in line with common sense but counter to "standard" economic logic. Such logic would, of course, predict that in an integrated market, there would be greater labor demand in the cheaper regions.

With regard to our supply variables, we expect a higher proportion of youth in the population to increase regional unemployment. This stems from the straightforward fact that young people face the burden of transitioning to the work force and are thus hard to employ and to keep employed.

Finally we expect pay inequality and unemployment rates to be positively related. This expectation, also counter to "standard" economic logic, is based on theoretical arguments already presented by Galbraith and Garcilazo (2004), which we condense next.

Simon Kuznets (1955) proposed the idea that economic development first increases and then subsequently decreases inequality, producing an inverted U curve of inequality as a function of the level of income. Although the Kuznets hypothesis was built to explain the evolution during the transitional period from agriculture to industry in now-industrialized lands, Harris and Todaro (1970) developed a model of unemployment capturing these characteristics, in a paper aimed mainly at development economists. In their model, workers migrate from a low-marginal-product rural sector to cities where minimum wages are imposed, and accept a high probability of sustained unemployment in exchange for a low probability of getting one of those jobs and enjoying the resulting rise in income. The equilibrium condition is that the expected value of the gain be just equal to cost incurred in leaving rural employment, and this condition entails substantial equilibrium unemployment. From this, a positive relationship between urban/rural pay inequality and equilibrium unemployment emerges.

Galbraith (1998) extended these arguments into modern advanced societies, arguing that there existss an elite group of knowledge and finance workers, a core of manufacturing

workers, and a large reservoir of workers in the services, and that wage-setting in these three classes behaves very differently. In the knowledge and finance sector, wages are protected by barriers of entry, such as academic credentials and technical expertise; in the manufacturing sector, workers enjoy a wage premium where wages fluctuate with the performance of the firm, and in the service sector they are typically determined by socially mandated minimum wages.

So long as the differential between service wages and manufacturing wages is fairly small, *or* if it is possible to search for better jobs while working, services workers will not abandon current employment to seek for better. But on the other hand, if there are large differentials and obstacles to on-the-job search, they will do so. In that event, unemployment will rise as inequality rises.

This logic applies with special force to young workers who have not entered the labor market and do not possess technical expertise. Young workers know that the transition from being a low skilled worker to becoming a high skilled worker is problematic, and thus have an incentive to avoid being labeled as low-skilled. So long as they have an outside option, such as staying in school or living with their parents, they will avoid entering the labor force when only low-paid jobs are available. This process – delayed employment – occurs until higher paid jobs become available in labor markets, or equivalently when wage inequality increases. At that point, some will become employed while others will not, thus increasing the unemployment rate in the presence of high inequality.

Finally Rehn and Meidner (1951) developed further theoretical arguments supporting a positive relationship between wage inequality and unemployment. The Rehn-Meidner model was based on what they called a *solidarity wage policy*. This policy exerts pressure on firm profits and as a result shuts down low productivity companies. This pressure along with the restraint of high wages expands the production and employment of more productive companies and sectors, creating new jobs, greater wealth, and lower rates of unemployment.

In sum, the regional model depends on four regional factors: pay inequality (+), the youth proportion in the population (+), economic growth rate (-) and relative wages (-). To these we add country and time-specific fixed effects.

Model Specification and Data Sources

Our regions are classified according to NUTS level 2 except for the regions of Germany and United Kingdom where data are only available at NUTS level 1. A list of regions is included in the appendix (Appendix 2). Data are mainly taken from Eurostat's REGIO data base (http://www.eu-datashop.de) and from the OECD's Regional Database.

The dependent variable and three independent variables (proportion of youth population and growth rates of GDP, and wealth of regions) are directly available with a minor calculation from the REGIO accounts published by Eurostat: the youth population is obtained by dividing the number of people under 24 years of age by the total population in each region, growth rates of GDP is obtained by computing the annual change in regional GDP per capita. We compute relative income of regions by calculating a region's average pay (total compensation/total employees) relative to the European average as a whole. The value of this variable varies above and below 1, with the value of 1 if the region has the same average wage as Europe.

Our measure of inequality is constructed through the between-sectors within-regions Theil's T statistic (equation 1). The raw data used in this measure are compensation of employees (e2rem95) and employment (e2empl95) for 187 regional entities among sixteen major economic sectors. Given that Eurostat no longer publishes employment regional data for 16 sectors in recent years, we used employment data from the OECD's Regional Database for 15[8] sectors for regions in Spain, France, Italy, Ireland, Austria, Portugal, Finland, Czech Republic, Hungary and Poland. In the remaining regions to obtain comparability we aggregated sectors (a) agriculture, hunting and forestry and (b) fishing into one sector for all observations from 1995-2003.

Finally data for unemployment rates are disaggregated by gender and by age. Our data coverage expands the original sample used in Galbraith and Garcilazo (2004) by adding

[8] The OECD 's industrial classification is the same as Eurostat except sectors (a) agriculture, hunting and forestry and (b) fishing are aggregated into one.

approximately 400 new observations (the years 2001-2003 for all regions and 31 regions from Poland, the Czech Republic and Hungary) to the sample and it re-computes approximately 500 observation of pay-inequality from a different data source (the OECD Regional Database) using 15 instead of 16 industrial sectors. Our sample covers two decades (1984-2003) with a total of 1834[9] observations.

The regression model is a reduced form, two-way fixed-effects panel specified as follows:

$$UN = a + B_1 Theil + B_2 RelWage + B_3 GDPG + B_4 PopUn24 + D_i Country + D_j Time \quad (3)$$

where:

UN = Regional unemployment rate

Theil = Pay inequality across sectors for each region

RelWage = Average regional wages relative to the European average

GDPG = Growth rate of GDP at the regional level

PopUn24 = proportion of the regional population under 24 years of age

Country = Dummy to capture fixed country effects

Time = Dummy to capture fixed time effects

Table 1 presents coefficient estimates and their corresponding p-values for five dependent variables reflecting estimates for the whole population and its component parts: men, women, older and younger workers (ages greater or less than 25 years).

[9] This number includes the total number of regions where data for all four independent variables and the dependent variables are available.

Table 1. Coefficient Estimates: Linear Model - (1984-2003).

	Model 1 Total		Model 2 Male		Model 3 Female		Model 4 Youth		Model 5 Elderly	
tot_un	Beta	P>|t|	Beta	P>|t|	Beta	P>|t|	Beta	P>|t|	Beta	P>|t|
wn_theil	4.326	0.002	3.806	0.002	7.207	0.000	12.168	0.000	3.994	0.001
pop24	54.715	0.000	48.115	0.000	72.367	0.000	103.683	0.000	38.898	0.000
relwage	-0.084	0.077	-0.025	0.615	-0.079	0.276	-0.250	0.110	-0.031	0.444
g_gdp	-10.255	0.000	-10.654	0.000	-7.507	0.003	-15.870	0.000	-8.863	0.000
constant	-8.588	0.000	-8.696	0.000	-11.736	0.000	-10.881	0.000	-6.246	0.000
R^2	0.5695		0.568		0.5994		0.603		0.5356	
N	1834		1824		1829		1791		1833	

The results generally validate our ex-ante expectations as well as confirm previous results by Galbraith and Garcilazo (2004): pay-inequality and youth population increase regional unemployment rates, while GDP growth reduces unemployment. The relative wealth variable is weaker than it was in the previous sample, and is only marginally significant in the total population model. All other variables are highly significant for all population sub-groups and have the theoretically correct sign. In particular this is true of the controversial measure of within-region inequality.

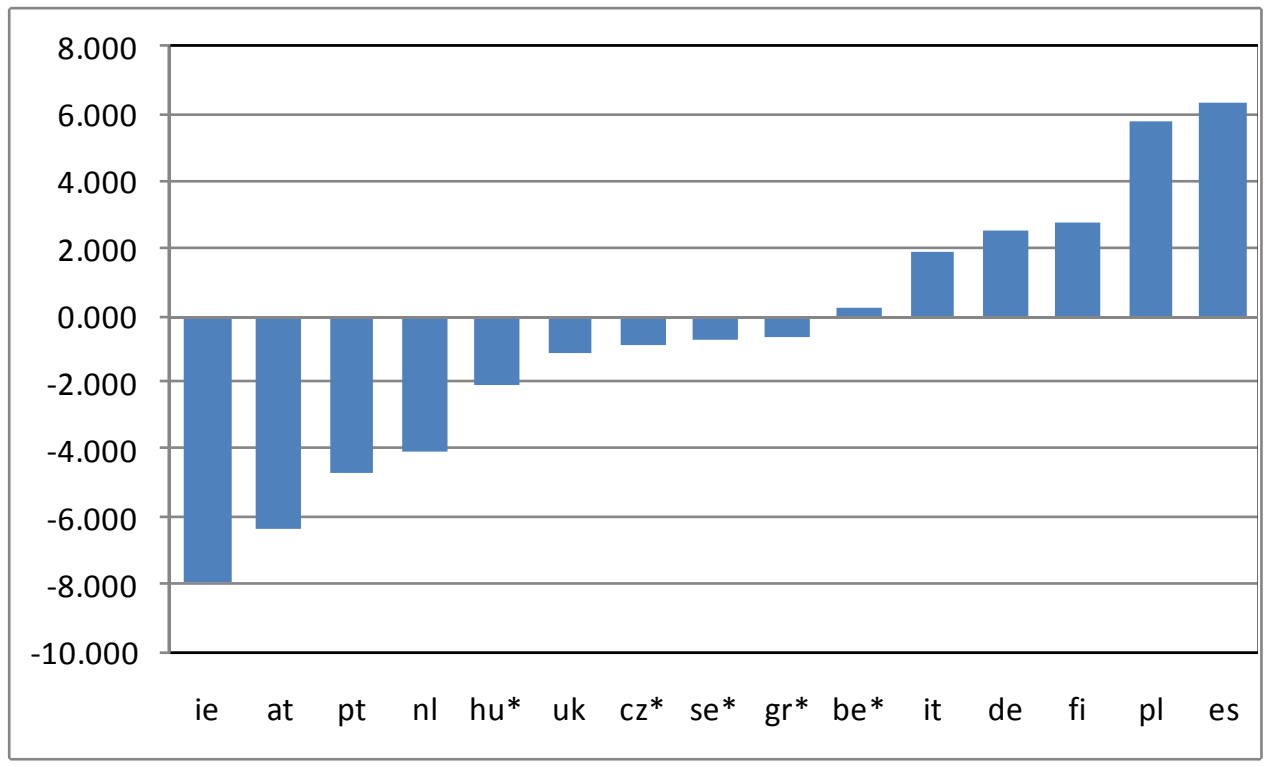
The coefficients are systematically higher for less mobile populations (women, and younger workers) with the exception of GDP growth for women. The explained variation is around 56 percent, taking into account the fixed effects.

The country effects capture the common variation in all regions from a given country, and the time effects capture the common variation in all European regions from a given year after controlling for other factors of causation. As in Galbraith and Garcilazo (2004) we interpret the country-effects to be estimates of country-specific factors such as the effects of national labour market institutions, the informal economy and migration patterns on regional unemployment, while we interpret the time-effects as estimates the effects of European-wide policies on regional unemployment.

For mathematical purposes the two-way fixed-effects model requires *i-1* country dummies and *j-1* time dummies. We excluded France as a country dummy and the year 1985 as a time dummy. Thus the coefficients of each country (year) dummy are relative to France (1985).

Figure 5 graphs the national dummies for the benchmark model (Model 1 with total unemployment). The country fixed effects are statistically significant in all countries except in Hungary, the Czech Republic, Sweden, Greece and Belgium. Their magnitude is relatively unimportant in the United Kingdom, the Czech Republic, Sweden, Greece and Belgium when France is used as baseline observation with plus or minus two percent as a threshold. Spain, Poland, Finland and Germany have higher unemployment than one would expect, while Ireland, Austria, Portugal, the Netherlands and Greece have lower unemployment than otherwise expected.

Figure 5. Country Fixed Effects in European Unemployment



*Statistically insignificant at ten percent significant level

We believe that the lower-than-expected unemployment rates in Ireland and Austria are due to strategic wage-setting. These are small countries with strong collective wage bargaining, who have a consistent pattern of setting wages in tradeable goods sectors (and only those) at a significant discount to their larger neighbour (Galbraith and Garcilazo, 2004). They thus offer themselves as attractive targets for industrial location, and are able to generate domestic full employment at the expense of the UK in Ireland's case and Germany for the case of Austria. Ireland also benefited from a large IT boom but the effect of this should be largely captured by the growth rate variable.

The lower-than-expected level of measured unemployment in Portugal might be due to the existence of a large emigrant population, which disappear from the local labour force and therefore from local unemployment data.

Contrary to the findings in Galbraith and Garcilazo (2004), the country effects for the UK do not appear large, in fact as additional years were added to the sample they became non-existent. This would tend to reduce the force of arguments that the UK's deregulated ("Anglo-Saxon") labor market has conferred special advantages on that country. Country effects for other large European countries, notably Germany and Italy, are statistically significant but small, and do not account for a large share of total variance in the model. They also differ only a little from that of Sweden, suggesting that there are not large institutional differences across Europe, except those already captured by differences in inequality and population structure. This either poses a challenge to the "varieties of capitalism" approach to the explanation of unemployment, or suggests that our inequality measure may be a good instrument for capturing the critical difference between varieties of capitalism.

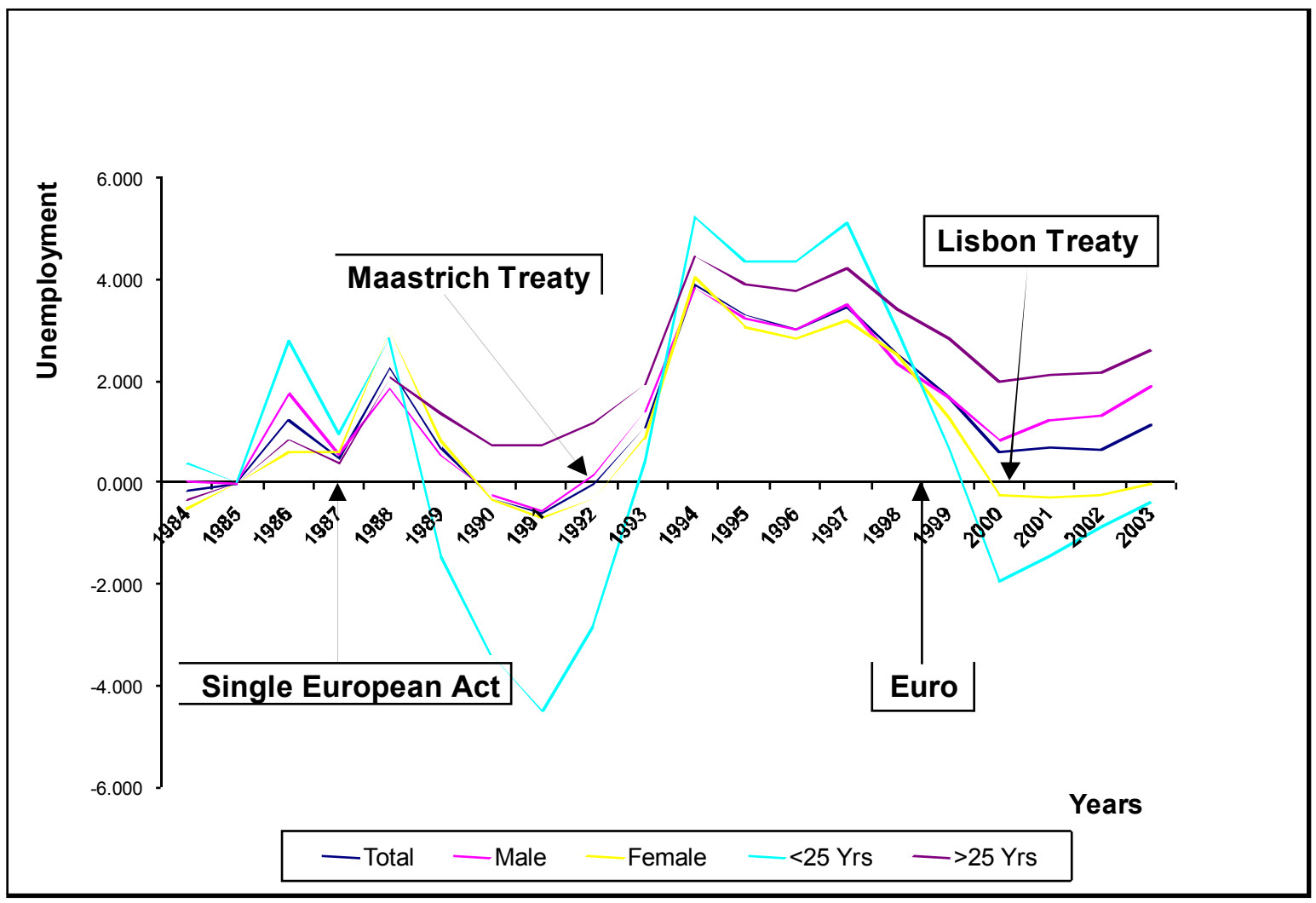
Unemployment in Spain remains higher than expected, as also found in our previous estimates. This might be due to the notoriously large cash economy in Spain. Several authors have assigned the blame to "wage rigidity" in Spanish labor markets, as argued by Bentolila and Jimeno (1998), Bover *et al.* (2000), (Montuenga *et al.* (2003) and Bentolila and Jimeno, (2002). We, however, doubt that interpretation, as we have already accounted in our model for the effect of pay inequality, a good measure, in our view, of rigidity as usually conceived. The high country-effects for Poland, on the other hand, might be in some part a statistical artifact. Recent estimates by the Polish government[10] calculate there are approximately one million Polish immigrants in the UK still registered as unemployed in their home country.

The time effects measure common variation in all regions during a given year. We interpret these effects as showing the consequences of policies and shocks on the European scale. The effects obtained are, broadly speaking, consistent with the results obtained in Galbraith and Garcilazo (2004), although the magnitude of the 1994 peak in our present study is one percentage point lower and effects in 1997 one percentage point higher (Figure 6). This trend reveals an employment penalty associated with the Maastricht Treaty (1992) and its implementation, through 1998, of around 4 percentage points. The arrival of the Euro in 1999 appears to have a positive effect on unemployment, especially for youth workers. This

[10] http://www.euractiv.com/en/mobility/poland-unemployment-statistics-artificially-boosted/article-159526

positive trend is reversed in the year 2000 coinciding with the implementation of the Lisbon Treaty.

Figure 6. Time Fixed Effects in European Unemployment



3. Conclusions and Policy Implications

The European Commission's main objective in the area of cohesion has been the reduction of regional disparities *across* the EU territory so as to achieve *balanced development* that promotes equal opportunities for all citizens of Europe. Our results find that achieving cohesion *within* European regions also to be important for development purposes, at least in order to attain full employment.

The relationship we find between wealth and inequality, along with the positive impact of pay inequality on unemployment in our regressions, suggests that promoting cohesion in the structure of pay in lagging regions could lead to a catching-up process leading to territorial cohesion. These findings go counter to the common view that Europe needs *more* pay inequality ("flexibility") rather than less, but it is consistent with the Rehn-Meidner model that underlay much of the successful development strategy of Scandinavia in the postwar era.

Policies that promote cohesion in lagging regions include raising minimum wages, targeting industrial development policies in poor areas, active labor market polices for the unemployed, policies to improve workers' skills such as on-the-job training, adult education, and assistance programs for people at the bottom. Measures that promote interregional coherence could (and we believe should) be expanded from the construction and infrastructure projects that currently dominate the regional funds to include payments to individuals, particularly to top up pensions and the minimum wage, on the models of continental Social Security and the Earned Income Tax Credit of the United States. Galbraith (2006) provides an in-depth discussion.

The larger effects of inequality on youth unemployment suggest that measures to provide jobs for young workers could ameliorate youth unemployment, still chronic in many European regions, so long as such programs did not involve stigmatizing their participants as otherwise unemployable. However, expanding university enrollments is perhaps the proven effective route to reducing youth unemployment, since it largely reclassifies the unemployed as "students," avoiding stigma while giving young people a chance to grow out of their problem. Time heals, as they say.

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Appendix 1 -- Sectorization used to Calculate Regional Inequality

Sectors by NACE-CLIO (1984-1994)	Sectors by NACE (1995-2000)
B06-Fuel and power products	A-Agriculture, hunting and forestry
B13-Ferrous and non-ferrous ores and metals,r***	B-Fishing
B15-Non-metallic minerals and mineral products	C-Mining and quarrying
B17-Chemical products	D-Manufacturing
B24-Metal products, machinery, equipment and^	E-Electricity, gas and water supply
B28-Transport equipment	F-Construction
B36-Food, beverages, tobacco	G-Wholesale and retail trade; repair of*
B42-Textiles and clothing, leather and footwear	H-Hotels and restaurants
B47-Paper and printing products	I-Transport, storage and communication
B50-Products of various industries	J-Financial intermediation
B53-Building and construction	K-Real estate, renting and business activities
B58-Recovery, repair, trade, lodging and^^	L-Public administration and defence; ss**
B60-Transport and communication services	M-Education
B69-Services of credit and insurance institutions	N-Health and social work
B74Other market services	0-Oth. Comm.., social, personal service act.
B86Non-market services	P-Private households with employed persons

* motor vehicles, motorcycles and personal and household goods
** compulsory social security
*** other than radioactive
^ electrical goods
^^ catering services

Appendix 2 – European Regions used in Sample

be1 Région Bruxelles-capitale
be21 Antwerpen
be22 Limburg (B)
be23 Oost-Vlaanderen
be24 Vlaams Brabant
be25 West-Vlaanderen
be31 Brabant Wallon
be32 Hainaut
be33 Liège
be34 Luxembourg (B)
be35 Namur
de1 Baden-Württemberg
de2 Bayern
de3 Berlin
de4 Brandenburg
de5 Bremen
de6 Hamburg
de7 Hessen
de8 Mecklenburg-Vorpommern
de9 Niedersachsen
dea Nordrhein-Westfalen
deb Rheinland-Pfalz
dec Saarland
ded Sachsen
dee Sachsen-Anhalt
def Schleswig-Holstein
deg Thüringen
gr11 Anatoliki Mak. &Thraki
gr12 Kentriki Makedonia
gr13 Dytiki Makedonia
gr14 Thessalia
gr21 Ipeiros
gr22 Ionia Nisia
gr23 Dytiki Ellada
gr24 Sterea Ellada
gr25 Peloponnisos
gr3 Attiki
gr41 Voreio Aigaio
gr42 Notio Aigaio
gr43 Kriti
es11 Galicia
es12 Principado de Asturias
es13 Cantabria
es21 Pais Vasco
es22 Comunidad de Navarra
es23 La Rioja
es24 Aragón
es3 Com. de Madrid
es41 Castilla y León
es42 Castilla-la Mancha
es43 Extremadura
es51 Cataluña
es52 Com. Valenciana
es53 Illes Balears
es61 Andalucia
es62 Murcia
es63 Ceuta y Melilla (ES)
es7 Canarias (ES)
fr1 Île de France
fr21 Champagne-Ardenne
fr22 Picardie
fr23 Haute-Normandie
fr24 Centre
fr25 Basse-Normandie
fr26 Bourgogne
fr3 Nord - Pas-de-Calais
fr41 Lorraine
fr42 Alsace
fr43 Franche-Comté
fr51 Pays de la Loire
fr52 Bretagne
fr53 Poitou-Charentes
fr61 Aquitaine
fr62 Midi-Pyrénées
fr63 Limousin
fr71 Rhône-Alpes
fr72 Auvergne
fr81 Languedoc-Roussillon
fr82 Pr.-Alpes-Côte d'Azur
fr83 Corse
ie01 Border, Mid. & Western
ie02 Southern and Eastern
itc1 Piemonte
itc2 Valle d'Aosta
itc3 Liguria
itc4 Lombardia
itd1 Pr. A Bolzano-Bozen
itd2 Pr. A Trento
itd3 Veneto
itd4 Friuli-Venezia Giulia
itd5 Emilia-Romagna
ite1 Toscana
ite2 Umbria
ite3 Marche
ite4 Lazio
itf1 Abruzzo
itf2 Molise
itf3 Campania
itf4 Puglia
itf5 Basilicata
itf6 Calabria
itg1 Sicilia
itg2 Sardegna
nl11 Groningen
nl12 Friesland
nl13 Drenthe
nl21 Overijssel
nl22 Gelderland
nl23 Flevoland
nl31 Utrecht
nl32 Noord-Holland
nl33 Zuid-Holland
nl34 Zeeland
nl41 Noord-Brabant
at11 Burgenland
at12 Niederösterreich
at13 Vienna
at21 Kärnten
at22 Steiermark
at31 Oberösterreich
at32 Salzburg
at33 Tirol
at34 Vorarlberg
nl42 Limburg (NL)
pt11 Norte
pt15 Algarve
pt16 Centro (PT)
pt17 Lisboa
pt18 Alentejo
pt20 R. A. dos Açores (PT)
pt30 R.A. da Madeira (PT)
fi13 Itä-Suomi
fi18 Etelä-Suomi
fi19 Länsi-Suomi
fi1a Pohjois-Suomi
fi20 Åland
se01 Stockholm
se02 Östra Mellansverige
se04 Sydsverige
se06 Norra Mellansverige
se07 Mellersta Norrland
se08 Övre Norrland
se09 Småland med öarna
se0a Västsverige
ukc North East
ukd North West
uke Yorkshire & Humber
ukf East Midlands
ukg West Midlands
ukh Eastern
uki London
ukj South East
ukk South West
ukl Wales
ukm Scotland
ukn Northern Ireland
cz01 Praha
cz02 Střední Cechy
cz03 Jihozápad
cz04 Severozápad
cz05 Severovýchod
cz06 Jihovýchod
cz07 Střední Morava
cz08 Moravskoslezsko
pl11 Lódzkie
pl12 Mazowieckie
pl21 Malopolskie
pl22 Slaskie
pl31 Lubelskie
pl32 Podkarpackie
pl33 Swietokrzyskie
pl34 Podlaskie
pl41 Wielkopolskie
pl42 Zachodniopomorskie
pl43 Lubuskie
pl51 Dolnoslaskie
pl52 Opolskie
pl61 Kujawsko-Pomorskie
pl62 Warminsko-Mazurskie
pl63 Pomorskie
hu10 Közép-Magyarország
hu21 Közép-Dunántúl
hu22 Nyugat-Dunántúl
hu23 Dél-Dunántúl
hu31 Észak-Magyarország
hu32 Észak-Alföld
hu33 Dél-Alföld